

CLAIMS

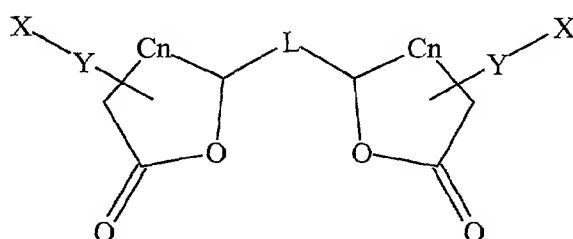
What is claimed is:

1. A lactone composition as represented in structure I, wherein each n is independently 1 to 3;

5 L is either present as a substituent having two functional groups, or is a direct bond forming a spiro-bislactone, or is H wherein rings of the structure I are not connected;

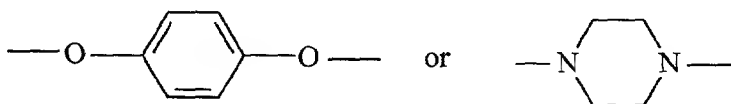
wherein Y is either present independently as alkenyl, alkynyl, or aryl or is a direct bond;

10 each X is independently a substituent having a field effect, F, between -0.42 and +1.58



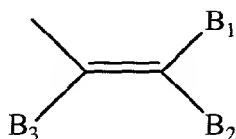
I

15 with the proviso that when L is a substituent having two functional groups, L is not



20

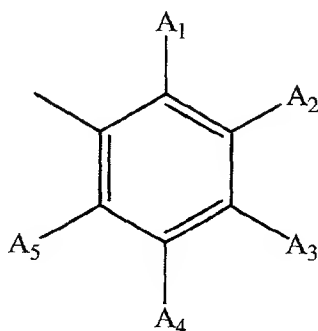
2. The lactone of Claim 1 wherein when Y is alkenyl, the alkenyl group is defined as



25

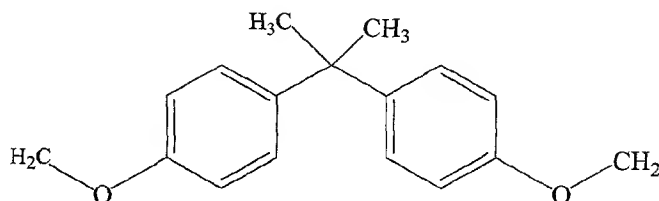
wherein B₁, B₂, and B₃ are individually a substituent group X as defined in Claim 1.

3. A lactone of Claim 1 wherein when Y is phenyl



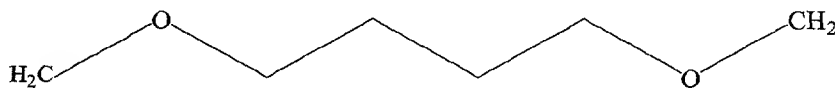
5 wherein A₁, A₂, A₃, A₄, and A₅ are each independently a substituent group X as defined in Claim 1.

4. A composition of Claim 1 wherein the L substituent having two functional groups is



10

5. A composition of Claim 1 wherein the L substituent having two functional groups is



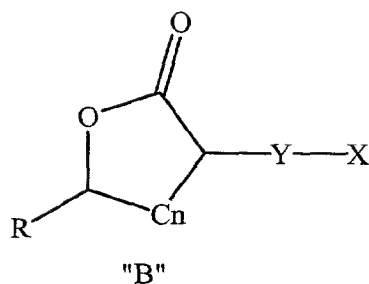
15

6. A composition of Claim 1 wherein X is selected from the group consisting of and identified with the numbers 2, 5, 15, 28, 30, 32, 33, 34, 35, 37, 40, 43, 45, 47, 48, 49, 58, 62, 70, 74, 75, 76, 77, 78, 80, 84, 85, 90, 93, 94, 95, 97, 98, 99, 100, 101, 102, 103, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 122, 125, 127, 128, 133, 139, 141, 142, 143, 144, 148, 150, 151, 153, 156, 160, 161, 162, 163, 165, 166, 167, 168, 169, 175, 177, 178, 179, 185, 186, 187, 188, 189, 191, 192, 193, 194, 195, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 219, 221, 222, 223, 224, 225, 231, 232, 233, 234, 238, 239, 240, 241, 242, 243, 244, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 283, 284, 285, 286, 288,

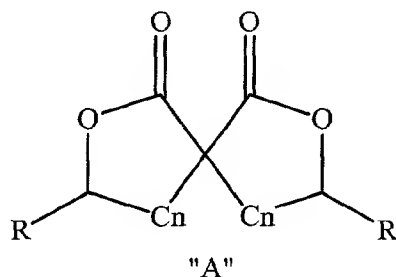
289, 291, 292, 293, 294, 295, 297, 298, 300, 301, 302, 303, 304, 305, 306, 307, 308, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 5 363, 364, 365, 366, 367, 368, 369, 370, 371, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 10 447, 448, 449, 450, 451, 452, 453, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 15 527, 528, 529 and 530 in Table 1.

7. A composition of Claim 1 wherein X is selected from the group consisting of and identified with the numbers 2, 5, 15, 28, 32, 33, 40, 45, 49, 70, 75, 76, 78, 80, 84, 85, 90, 93, 99, 100, 101, 102, 103, 111, 117, 118, 119, 120, 122, 125, 127, 128, 133, 139, 141, 142, 143, 144, 148, 150, 151, 153, 156, 160, 20 161, 162, 165, 166, 167, 168, 169, 175, 177, 178, 179, 185, 186, 187, 188, 189, 191, 192, 193, 194, 194, 198, 199, 200, 201, 202, 203, 207, 210, 211, 212, 213, 214, 215, 216, 217, 219, 221, 222, 223, 224, 225, 231, 232, 233, 234, 238, 239, 240, 241, 250, 251, 252, 253, 254, 267, 270, 271, 272, 273, 275, 276, 277, 278, 279, 285, 291, 292, 293, 294, 295, 297, 298, 300, 303, 317, 318, 323, 325, 332, 25 333, 334, 335, 336, 337, 345, 378, 379, 380, 384, 388, 395, 396, 403, 404, 405, 406, 407, 408, 409, 410, 411, 416, 417, 420, 424, 425, 433, 448, 449, 450, 453, 458, 460, 474, 475 and 512 in Table 1.

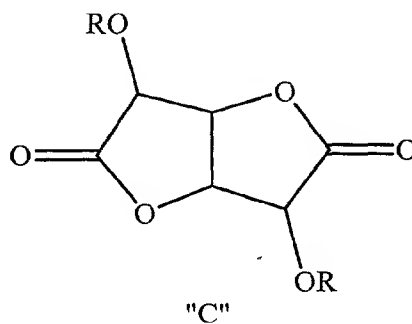
8. A process comprising: contacting lactones of structure B with an amine to form a hydroxy amide, wherein each Y is present independently as 30 alkenyl, alkynyl, aryl, or a direct bond to X; each X is independently a substituent having a field effect, F, between -0.42 and $+1.58$; wherein R is a branched or straight chain alkyl group of C_1 to C_{10} , or an aryl group; and wherein each n is independently 1 to 3



9. A process comprising: contacting a spiro-bislactone of structure A, wherein each $n = 1$ to 3 independently and R is a branched or straight chain alkyl group of C_1 to C_{10} , or an aryl group; and wherein each n is independently 1 to 3 ; with an amine to form a hydroxy amide

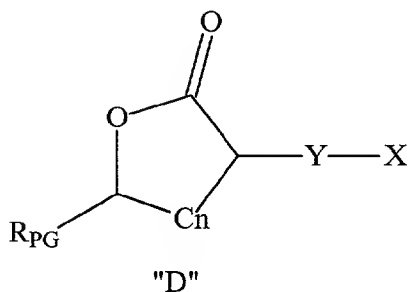


10. A process comprising: contacting a bicyclo-lactone of structure C wherein R is a branched or straight chain alkyl group of C_1 to C_{10} , or an aryl group, or $C(O)OE$ wherein E is independently alkyl or aryl, with a amine

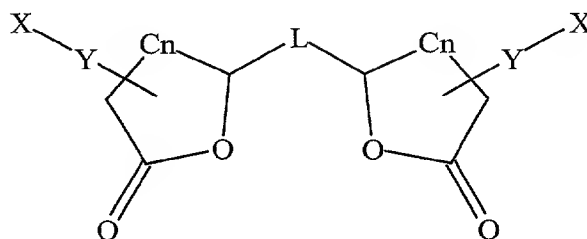


11. A process comprising: contacting a polymer containing one or more lactone groups prepared from at least one lactone monomer of structure D with an amine to form a hydroxy amide, wherein each Y is present independently as alkenyl, alkynyl, aryl, or a direct bond to X; each X is independently a substituent having a field effect, F, between -0.42 and $+1.58$; wherein R_{PG} is a radically polymerizable substituent group selected from the group consisting of styrene,

acrylate, methacrylate, acrylamide, and methacrylamide; and wherein each n is independently 1 to 3



- 5 12. A process, comprising:
- (i) performing the steps of any one of the Claims 8, 9, 10 or 11;
 - (ii) applying a product resulting from step (i) to an object surface.
13. An article treated by the process of Claim 12.
- 10 14. A lactone composition having the structural formula I, wherein each n is independently 1 to 3;
- L is either present as a substituent having two functional groups, or is a direct bond forming a spiro-bislactone, or is H wherein rings of the structure I are not connected;
- wherein Y is either present independently as alkenyl, alkynyl, or aryl
- 15 or is a direct bond;
- each X is independently a substituent having a field effect, F, between -0.42 and +1.58



20 wherein said lactone is employed as a cross-linking agent in a coating composition containing amine compound(s) that are reactive with lactone groups.